

## REMARKS

Claims 7-12 have been amended to recite "storage haze" and to recite that the reduction in storage haze is compared to an untreated tea extract. Support for the amendment appears throughout the specification as filed, e.g., p. 2, lines 15-29.

It is respectfully submitted that the present amendment presents no new issues or new matter and places this case in condition for allowance. Reconsideration of the application in view of the above amendments and the following remarks is requested.

### **I. The Rejection of Claims 7-20 under 35 U.S.C. 112, Second Paragraph**

Claims 7-20 stand rejected under 35 U.S.C. 112, second paragraph as allegedly being indefinite. This rejection is respectfully traversed.

#### Claims 7-12

The Examiner contends that claims 7-12 are unclear in what the claimed reduction of storage haze in the tea extract is being compared to, and in the recitation of "storage induced haze." Applicants' amended claims recite that the tea extract prepared according to the claimed method results in storage haze formation that is reduced by at least 10% compared to an untreated tea extract. Applicants have also deleted the term "storage induced haze." Applicants respectfully submit that the Examiner's rejections are obviated thereby.

#### Claims 14-15

The Examiner further contends that claims 14-15 are unclear in the recitation of "is derivable." The Examiner states that the term could mean that the pectin lyase is able to be derived from the particular fungus, or that the pectin lyase claimed in the instant application is in fact derived from the particular fungus. Applicants respectfully submit that the claimed usage of "is derivable from" is clear.

As an initial matter, Applicants note that the Examiner's alleged alternative meanings of "is derivable" are not mutually exclusive. A pectin lyase that is in fact derived from a particular fungus is of necessity able to be derived from that particular fungus. The identified claims merely specify the fungal source. See also specification as filed, p. 3, lines 1-6. Accordingly, Applicants respectfully submit that the claim term is sufficiently clear to one of skill in the art.

#### Claims 16-20

Claims 16-20 are included in the rejection, but the Examiner has not identified with particularity any alleged defects in these claims. Applicants respectfully submit that claims 16-20 as filed comport with the requirements of 35 U.S.C. 112, second paragraph.

For the foregoing reasons, Applicants submit that the amended claims overcome this rejection under 35 U.S.C. 112, second paragraph. Applicants respectfully request reconsideration and withdrawal of the rejection.

## **II. The Rejection of Claims 7-20 under 35 U.S.C. 103**

Claims 7-12 stand rejected under 35 U.S.C. 103 as allegedly being unpatentable over Kogya, CN 87103320, English-language translation provided by Examiner (hereinafter "Kogya") in view of Kuntz, *Enzymes that Aid Beverages*, Food Product Design, pp. 1-6 (1996) (hereinafter "Kuntz") and further in view of Tsai, U.S. Patent No. 4,639,375 (hereinafter "Tsai"). Claims 13-15 stand rejected as allegedly unpatentable over Kogya in view of Kuntz and Tsai and further in view of Bida, *Progress in the Molecular Biological Study of Fungal Pectinases*, *Advances in Bioengineering*, vol. 20, pp. 14-18 (2000), English-language translation provided by Examiner (hereinafter "Bida"). Claims 16-19 stand rejected as allegedly unpatentable over Kogya in view of Kuntz and Tsai and further in view of Sanderson, U.S. Patent No. 3,787,582 (hereinafter "Sanderson"). Claim 20 stands rejected as allegedly unpatentable over Kogya in view of Kuntz and Tsai and further in view of Alkorta, *Immobilization of Pectin Lyase from *Pencillium italicum* by Covalent Binding to Nylon*, *Enzyme and Microbial Technology*, pp. 141-146 (1996) (hereinafter "Alkorta"). This rejection is respectfully traversed.

Applicants' amended claims are directed to a method for reducing storage haze formation in a packaged tea extract, comprising contacting the tea extract with a pectin lyase; separating insoluble solids from the tea extract; and packaging the tea extract; wherein the storage haze formation is reduced by at least 10% compared to an untreated tea extract.

Kogya purports to describe a method of producing a tea drink that does not form any sediment even when stored for a long time. Kogya, Abstract. The method involves adding alcohol to the resulting processing liquor after the enzymatic processing of an extract of tea, and after solid-liquid separation, removing the alcoholic component of the separated liquor if necessary. *Id.*, p. 1, paragraph 6. Kogya states that the enzyme is composed mainly of  $\alpha$ -amylase and glucoamylase and pectinase. *Id.*, p. 2, paragraph 2. Example 1 of Kogya states that when no enzyme or alcohol is used, sediment forms in seven days, and when alcohol alone is used, without added  $\alpha$ -amylase and glucoamylase enzymes, sediment forms in three weeks. *Id.*, p. 3, paragraphs 4-9. As the Examiner admits, nowhere does Kogya teach using pectin lyase, let alone contacting tea extract with a pectin lyase.

Nor does Kuntz cure this defect. In the context of tea, Kuntz teaches that the "caffeine and polyphenols in tea complex to form insoluble complexes in cold conditions, creating the 'tea cream' seen in iced tea. Enzymatically modifying this complex with tannase increases the cold water solubility of tea solids and produces a clear tea beverage." Kuntz, p. 3, paragraph 8. Kuntz discloses pectinase only in the context of wine and fruit juice. Id., p. 3, paragraph 4 and p. 4, paragraphs 8-9. Specifically in the fruit juice context, Kuntz states that the pectinase is "primarily pectin methyl esterase (PME) and polygalacturonase (PG)" and outlines the mechanisms by which each of these enzymes purportedly acts. Id., p. 4, paragraph 4. Kuntz states that "[p]ectin lyase can also split the pectin polymer." Id. Nowhere does Kuntz teach or suggest the use of pectin lyase in tea processing, let alone contacting tea extract with a pectin lyase.

Neither does Tsai cure the defects of Kogya and/or Kuntz. Tsai purports to describe a process for the enzymatic treatment of black tea leaf, using tannase in combination with a cell-wall-digesting enzyme, such as cellulase, pectinase, papain or hemicellulase, *prior to extraction*. Tsai, Abstract. Pectinase enzyme is primarily expressed by its polygalacturonase activity. Id., col. 4, lines 15-22. The enzymatic treatment of Tsai does not include methods of treating tea extract at all. Moreover, nowhere does Tsai teach or suggest the use of pectin lyase, let alone contacting tea extract with a pectin lyase.

At best, Kogya would lead one of skill in the art to add alcohol to the resulting processing liquor after the enzymatic processing of an extract of tea. Moreover, Kuntz and/or Tsai would at best lead one of skill in the art to the use of pectin methyl esterase and/or polygalacturonase rather than to the pectin lyase used in Applicants' amended claims. Therefore, even if one of skill in the art were motivated to combine the teachings of Kuntz and/or Tsai with Kogya (which Applicants do not concede to be the case), Applicants respectfully submit that none of these references, either alone or in combination, render obvious Applicants' amended claims 7-12.

The Examiner further contends that claims 13-20 are rendered obvious over Kogya in view of Kuntz and Tsai and further in view of Bida (claims 13-15), Sanderson (claims 16-19) and Alkorta (claim 20). Applicants address each of these disclosures in turn; however, none of these references, either alone or in combination, cures the above-discussed defects in the teachings of Kogya, Kuntz and/or Tsai.

Bida purports to teach the cloning and investigation of fungal pectinase genes. Bida, Abstract. Sanderson purports to describe the treatment of tea extracts with a pectinase enzyme preparation. Sanderson, Abstract. Pectinase activity was essentially that described for polygalacturonase. Id., col. 3, lines 8-12. Alkorta purports to describe the nylon-immobilization of

pectin lyase and its application in fruit juices. Alkorta, Abstract. Again, none of these references teach the use of pectin lyase in tea brewing methods at all, let alone contacting tea extract with a pectin lyase. Accordingly, none of the pending claims are rendered obvious by any of Kogya, Kuntz, Tsai, Bida, Sanderson or Alkorta, either alone or in combination.

For the foregoing reasons, Applicants respectfully submit that the amended claims overcome this rejection under 35 U.S.C. 103. Applicants respectfully request reconsideration and withdrawal of the rejection.

### III. Conclusion

In view of the above, it is respectfully submitted that all claims are in condition for allowance. Early action to that end is respectfully requested. The Examiner is hereby invited to contact the undersigned by telephone if there are any questions concerning this amendment or application.

Should any fees be due, please charge deposit account no. 50-1701 of Novozymes North America Inc.

Respectfully submitted,

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Kristin McNamara, Reg. # 47692/  
Kristin J. McNamara, Reg. No. 47,692  
Novozymes North America, Inc.  
500 Fifth Avenue, Suite 1600  
New York, NY 10110  
(212) 840-0097